

APPARATUS AND METHOD FOR INTERACTIVE 3D REGISTRATION OF  
ULTRASOUND AND MAGNETIC RESONANCE IMAGES BASED ON A  
MAGNETIC POSITION SENSOR

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ABSTRACT OF THE DISCLOSURE

10           Intraoperative ultrasound (US) is integrated with stereotactic systems,  
where a system interactively registers two-dimensional (2D) US and three-  
dimensional (3D) magnetic resonance (MR) images. The registration is based on  
tracking a US probe with a DC magnetic position sensor. A transformation algorithm  
is performed to transform coordinates of points between two different spaces, where  
15   MR and US image spaces are independently registered with the position sensor  
space and where coordinate points can be registered between the MR and US  
spaces. A calibration procedure can be performed, and a phantom can be used to  
determine and analyze registration errors. The registered MR images can  
reconstructed using either zero-order or first-order interpolation.

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